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INFORMATION NEEDS IN THE LIGHT OF THE EMERGING AFRICAN ECONOMIC COMMUNITY AND POLICY IMPLICATIONS IN THE ACQUISITION AND UTILIZATION OF INFORMATION TECHNOLOGY IN AFRICA

INTRODUCTION

1. Information technology has profound implications for the future development of Africa, and for the evolving relationships between the North and the South. A full exploration of all the policy implications and concrete institutional proposals will require a sustained process of dialogue.

2. Information technologies generally comprise the machinery for producing and disseminating data/information. Some of these technologies include printing, reprographic, micrographic, computer, telecommunication, transportation and video technology.

3. Africa's lack of development over the years is attributed principally to the information poverty that has characterized the socio-economic development planning efforts of many countries on the continent since their attainment of political independence. The prevailing situation is not because the planning mechanisms of these countries lack data to base various meaningful socio-economic planning exercises. Rather, the problem has been the inability of African countries to develop and maintain appropriate information infrastructure.

I. THE EMERGING INFORMATION NEEDS IN AFRICA

4. It is widely agreed that over the last years social and economic conditions in the continent have deteriorated mainly because of adverse climatic conditions, deteriorating international economic relations, civil strife in many African countries, and inept economic management by governments. Both the understanding of African development problems, and implementing solutions, require substantial amounts of information input. But alterations in priorities cause corresponding changes in emphasis in information needs.

5. In sub-Saharan Africa, agriculture is regarded as a cornerstone of the economy. The present emphasis in development strategies in favour of agriculture and agro-industry, therefore, becomes one of the foundations for the priorities in information activities. Many African countries already possess agricultural statistics units, libraries and documentation centres. There has been much recent talk of early warning food security information and environmental monitoring systems. An effective way to meet the needs arising from multidimensional agricultural or rural development concerns includes farm management, adult education, farm credit, water management, appropriate technology, etc. It also includes the needs of multiple users involved in such processes, such as planners, extension agents, peasant leaders, district administrative officers, etc. This type of development requires innovative information collection, processing and delivery together with continuous experimentation and updating of methods. Recent technological advances in remote sensing, communication and data processing show unsurpassed potential for application in Africa, especially in the context of the proposed African Economic Community.

6. Sectoral development strategies, in areas such as trade, industrialization, transport, and communications and natural resources exploitation require greater emphasis. Trade and industrial information services are still at an embryonic stage. Most African Governments have not been able to secure in-depth knowledge of their natural resource base as yet. The information needs and ways of seeking such information on the African private sector are still little understood.

7. Public administration and economic planning, implementation and monitoring are the weakest links in the chain of government functions. Some of the shortcomings result from the inadequate availability and use of information. In addition, there is the need to follow-up and monitor the structural adjustment and readjustment processes which virtually all sub-Saharan African countries have initiated, particularly in their impact on social and economic life. There are three particular problems in this area: inadequate indicators to explain and monitor the phenomena, the lack of a mechanism for generating information and data, and thirdly, the absence of the information systems to regularly collect, process and deliver those indicators which have been defined and generated.

8. Information support for development pursuits takes numerous forms. Conventional thinking gave exclusive emphasis to printed, textual sources so that visual outputs with major information components, such as cartography or geological surveys, were not considered as information outputs for dissemination and enhanced utilization. In order to effectively make use of the available information resources in Africa, information technology utilisation by African countries is becoming imperative.

II. POLICY IMPLICATIONS IN THE APPLICATION OF INFORMATION TECHNOLOGIES IN AFRICA'S DEVELOPMENT

9. A review of the information infrastructure in Africa and the appraisal of the application of information technologies by libraries, information, documentation and data centres established to meet the information needs of development planners in respective countries of Africa, highlight a number of inadequacies in these two areas. These shortcomings derive primarily from the lack of appreciation of the role of information in development by the political and planning officers of most countries in Africa. This lack of appreciation has resulted in a number of policy gaps in those areas which are vital to the acquisition and use of modern technology for implementing socio-economic development objectives.

10. The conclusion which derives from the foregoing observations is that if Africa must achieve its socio-economic development goals and create an African Economic Community, then its countries must give priority to the development of their information infrastructure. They must strengthen existing establishments and create additional ones at national and regional levels on a continuing basis in order to ensure the availability of data/information relevant to their planning process. Greater emphasis must be placed on the use of appropriate information technology, which ensures timely and well-processed information.

11. By the same token, African countries must place adequate emphasis on the acquisition and use of modern information technologies in view of the important role that these technologies play in the generation and dissemination of information for development planning. The capacity of these technologies to store, process and disseminate large quantities of data with a high degree of speed and accuracy over time and space makes their use imperative in information activities. It is against this background that an examination of the policy and related issues on the application of information technologies will be undertaken. African countries should lay emphasis on this in their respective efforts at getting information technologies to respond to their individual and collective needs for plan development and execution.

12. In considering the potential for information technology utilisation in Africa, differences between the developed and the developing world should be born in mind. For example, in the United States, virtually every household has at least one telephone, while in Africa some countries have a telephone density of 1 unit per 1000 households, and the average density in Africa falls at 0.7 telephone lines per 100 households. Additionally, African telephone networks are concentrated in urban areas, where they are often poorly maintained and offer mediocre quality service. In the United States, nearly one-third of all households have personal computers, many of them equipped with modems. In the business sector, they have become nearly universal. While we are unaware of statistics of computer density in Africa, it is clear that many vital institutions operate without any computers (and without access to direct telephone lines). Even some national participating centres in the Pan-African Development Information System (PADIS) network have no computers.

13. While the Africa region is clearly deficient in modern information technology equipment, there is no question that at least some sectors in Africa must participate in the information age in order to remain competitive and part of an international economic order. Development and utilisation of information technology is inextricably linked with economic development. According to the Board on Science and Technology for International Development:

"Economic development in Africa will depend heavily on the development of the information sector. Countries will need the ability to communicate efficiently with local and overseas markets to determine where they may have comparative advantages for supplying their products to consumers to purchase essential imports, based on current prices and services. Many of the economic development problems facing African countries have scientific and technological components that will require solutions to be developed in Africa by African scientists. It is thus essential that they obtain the means to carry on the necessary research and developemnt and to provide realistic policy options to their governments and society: Lack of information is a critical constraint." (National Research Council, 1990)

14. The heart and soul of information technology lies in the ability to transfer data from its source to where it is needed, using the fastest means possible. Therefore, data communication infrastructure needs to be adequately developed in Africa. Information technologies can play a significant role in the implementation of upgraded technology transfer for the socio-economic and scientific transformation of Africa. The use of these technologies can greatly improve and facilitate planning, monitoring and delivery of national programmes. They also provide logistical support for coordinating distribution of goods and services to remote geographical locations. Of special mention are opportunities to improve the delivery of basic social services such as education, health care and dissemination of agricultural information, especially in rural areas for the benefit of small-scale farmers and women.

15. The application of information technologies in Africa has been handicapped by a number of political, and socio-economic problems which individual countries in Africa are facing. Among these are the following:

(a) The lack of awareness among policy makers regarding potential strategic opportunities as well as problem areas associated with the use of these technologies;

(b) The lack of understanding of the unique issues associated with planned and controlled introduction of these technologies; and

(c) The lack of experimental data on the relative effectiveness of various approaches and techniques for selecting the best alternative responses suited to the needs of a particular country.

III. MODALITIES FOR ACCESSING INFORMATION TECHNOLOGIES

16. In order to take advantage of the existing modern information technologies, African countries must adopt policies aimed at achieving self-reliance in the information activities in the following major areas:

(a) Computer acquisition and use;

(b) Human resources for technology development, use and maintenance; and

(c) Telecommunications.

A. Computer acquisition and use

17. Many African countries are presently almost entirely dependent on external sources for the procurement and use of computer technology (Adeyemi, 1988). If this situation continues for an undetermined period of time, African countries will continue to lose valuable foreign exchange which could be used to implement other socio-economic projects at home. Additionally, the challenge to develop some indigenous capacity in the manufacture of computers will continue to elude Africa. Therefore, the

development and effective implementation of policies relating to the acquisition, use and maintenance of computer hardware and software should occupy a high place on the scale of priorities of each African country. These policies should check undue proliferation of hardware configurations in the African countries. Additionally, these policies should determine the nature of agreements in such areas as software importation, training, know-how, and outright purchase of technology. African countries can gain from the experiences of other third world countries such as Brazil (Leeson 1984, Adler 1986), and India (Kumar, 1984) in the development of the indigenous capacity for the manufacture, use and maintenance of the computer technology within the context of south-south, technical cooperation among developing countries.

B. Human resources development

18. Deriving directly from (a) above is the need to develop viable national policies to develop the human resource base for the development, use and management of information technologies in Africa. The experience of countries in North Africa and those of English-speaking West Africa show the need to evolve such policies for manpower training in relevant areas of information work (Adeyemi 1988). The identified inadequacies of present training programmes in various African countries of Africa dictate the pressing nature of this need. Practical experience shows that library and information science programmes administered by African universities cannot adequately cope with the demand for the skilled manpower required to handle information technologies for accomplishing various information needs. The curricula of many of these institutions lack practical application in new information technologies (Adeyemi, 1988). Much emphasis is still placed on teaching traditional librarianship. The report of the UNECA/PADIS survey of available training facilities for information and documentation scientists in Africa (1988) provides the latest evidence for this assertion, the low return received to the questionnaire sent out for the exercise notwithstanding.

19. The need to develop skills for the management of information technology is imperative for the African countries. In 1988, UNESCO had this to say:

> "Only 0.4% of the world's 3.7 million scientists and engineers live in Africa. The figures, based on data for 1980, show that 88.8% of the world's 3,756,000 scientists and engineers live in developed countries. The regional disparity is even more evident in terms of numbers relative to overall populations. While the Soviet Union has 5,100 scientists and engineers per million inhabitants, North America 2,600 per million, Africa has only 49. Of the total research expenditure of US$207 billion worldwide (in 1980), only 0.3% was spent in Africa compared with 93.8% in developed countries and 6.2% for all developing countries. As a proportion of GNP, North America spent 2.28% on Research and Development, Europe 1.7%, the Soviet Union 4.7% and Africa 0.36%."

These figures tell a story, even when we allow for the definitional differences across countries and regions of the world. Indeed, because the 1980s were a "lost decade" for most of Africa, the figures today probably give an even less favourable comparison for Africa than in 1980. Most African countries still cannot give a precise indication of the financial and human resources devoted to research. The same report goes on to observe:

> "The situation in research training in Africa is just as gloomy. No African country spends more than 2% of GNP on higher education and for the majority the figure is under 1%..... (Computers in Africa).

The shortfall in technological skills is a very serious one, and one which will continue to be a severe constraint on the application of technology in African development. In the area of information technology (IT) applications for development, the shortage of IT professionals in Africa has led to reliance on expensive expatriate consultants. The effect of this is to slow down IT development because of the scarcity of financial

resources to pay for IT imports. The whole area of human resources development for the IT market should be a major component of Africa's national policies. Training for the IT market must start in African schools and extend to work places. Policies (especially on remuneration) that attract and keep IT professionals within our countries will have to be put in place if the brain-drain that has occured in other areas of educational development is not to be repeated.

20. Another problem hindering the effective utilisation of information technology relates to the African IT market, which is still little understood. There is a need to identify the regions "leading markets", the needs that drive these markets, and also to compile information on the likely demand for systems of all sizes in the next few years. Areas of concern include: users complaints regarding lack of training, unsatisfactory after sales maintenance, lack of software solutions on the market, and insufficient availability of software on the market to meet the potential user needs (Computers in Africa).

1. Telecommunications

21. Telecommunications facilities in many African countries have been described as deficient. In the majority of cases, the development of these facilities is rated as uneven, low level, grossly inadequate, and underinvested. The implementation of telecommunications in many African countries is characterized by:

(a) Unclear policies from government;

(b) Haphazard and uncoordinated planning;

(c) Poor quality of service;

(d) Underutilization of available resources;

(e) Lack of manufacturing capability;

(f) Inadequate logistic machinery (manpower, equipment/tools, transportation); and

(g) Proliferation of different technologies leading to problems of interworking the system and inadequate executive capacity.

22. In addition to the outlined policy issues required in the acquisition and utilisation of information technology, African Governments have to promulgate overall national informatics policies. Such policies may play vital roles in the development of informatics by motivating and guiding formative activities. Supporting legislation can be used to implement the policies through programmes, regulations, and the establishment of institutions to advise and support the development of information technology. The overall objective of policy actions is to enhance the effectiveness of information technologies at minimal economic and social cost. National informatics policies should identify the requirements, make provision for necessary resources and promote the effective use of informatics for the betterment of society.

23. National informatics policies should define the informatics requirements which are supportive of national development goals. Since it is not possible to meet all the requirements at once, priorities should emerge from the national planning process and be determined by the governments. Priority areas should be allocated adequate resources to ensure success. This process normally leads to the sectoral development of informatics which requires coordination to avoid duplication. An institutional framework must be established to define policy issues and coordinate policy implementation. Both policy formulation and review are best carried out by an inter-ministerial body which, in order to make it representative, should include representation from private professional bodies for example, the legal profession, electronic and electrical

engineers, and national computer organizations. This body, among other functions, should coordinate and manage government information technology and systems. Such a policy body requires both adequate staff and resources to carry out its duties that include developing guidelines for the development and management of information systems, reviewing information systems plans and proposals and controlling government spending on informatics projects.

2. Information technology in Africa's development and integration

24. Africa has entered its fourth development decade in a weaker economic position than any other developing region. There is no question that a dynamic approach is needed in every section to bring Africa out of its current development malaise. Information support for development is no exception to this. Solutions to Africa's socio-economic problems require, inter alia, a constant and adequate supply of accurate and timely information. A dynamic approach to information sharing can contribute to re-awakening of African development, particularly through a strategy emphasizing networking and economic integration.

25. In the area of information for development, the major problem is that most African countries are badly in need of information for development planning. While much of the necessary information exists, most of it resides in developed countries. It has become an axiom of the late twentieth century "Information Age" that developed countries are developed because they are "information rich" at the same time that developed countries forge ahead with information services as one of their major growth industries. In Africa information activities suffer from an absence of expertise in information generation and processing, storage and retrieval and from the fragmentation of information. This is due in large part to inadequate domestic information policies, an absence of information networks and the low level of information technology employed. As a result planning frequently takes place without sufficient facts, and projections are based on outdated data or inadequate documentation.

26. A clear need exists for the strengthening of African information systems and services in order for them to become dynamic providers of information for operational purposes. Revitalization needs to take place in the context of stemming the present North-South information flow and information dependency of the South, by emphasizing the provision and exchange of development information within Africa. Africa needs to develop a high level of self-reliance in the establishment and use of information systems. In order to do this, it needs to develop information technology know-how. Consequently African countries need fully developed information policies.

27. Information support for development is becoming particularly crucial in the context of the efforts which are underway to implement economic cooperation at subregional and regional levels and to build the African Economic Community and Common Market. These efforts can successfully bear fruit only if all African development partners have mutual access to the relevant information needed for decision making. PADIS can play a major role in strengthening information resources and capabilities of African countries, regional institutions, including those of the regional economic communities and groupings, and the private sector in Africa, both by providing the necessary information support and assisting in the development of viable information systems.

28. Through information networks developed using appropriate technologies, the economic integration of Africa may become a reality. For example, an Africa-wide electronic network requires up-to-date and reliable technology in order for it to be effective. Such a network could be assisted by computer mediated communications. Computer mediated communications, apart from serving as an inexpensive way of obtaining information from such a network, could also allow institutions like PADIS to send immediate help on information technology problems and encourage on-line discussions on all relevant issues.

29. The establishment of an African economic community and the development of regional economic groupings will, therefore, need to be further supported by computer networks for electronic information

exchange. Use of networks is essential for industrialists, investors and economic operators in order to get timely and accurate information for the design of a product or to gain access to a fruitful foreign market. Networking enables better circulation of information between partners in the private and public sector in the same continent and between continents. Networking also facilitates subregional and regional economic groupings in improving productivity profitability and reducing costs. PADIS, which is already identified as the lead institution in the field of computer networking in Africa as the result of its initiatives in the field, will promote networking as a mechanism for regional economic cooperation and integration in Africa. Electronic data interchange can be achieved in Africa if communities of interest and convenience form a link to share the same information. PADIS may be used to link its electronic network with those being developed in African institutions dealing with standards and technical regulations, trade information, food technology, manufacturing and design, and customs procedures, etc.

IV. RECOMMENDATIONS

30. Meaningful socio-economic development and integration of Africa is almost impossible without a sound information base for planning. By far the major obstacle to information infrastructure building in Africa is the inadequacy of financial and material resources available for information activities. Given the predominant role African Governments play in social and economic life, the low priority they attach to information activities is the major cause of prevailing shortcomings. The situation has been exacerbated by austerity measures enacted as a result of the prevailing crisis in the continent and by the increasing difficulty in disbursing funds for activities not budgeted for in development plans.

31. In order for the African countries to take advantage of the current and future information technology, the following are being recommended for their consideration:

(a) African Governments should take necessary action in regulating the importation of information technology in Africa. Experience has shown that in the majority of cases the technology imported into most of the African countries is not suitable;

(b) African Governments should at the national level harmonize the importation of information technology. This means that a central authority to oversee the importation and utilisation of information technologies must be created in most African countries. Such an arrangement at national level will effect quality control;

(c) A growing computer market in Africa should be promoted and a sustainable information technology be developed by import policies which give preference to and encourage the setting up of service facilities, standardization of certain operating systems and computer architecture;

(d) As much as 90 per cent of the value of information technology is in the area of software development and standard quality control. Standardization at the lower range of microcomputers should promote the development of local software firms;

(e) Concerted efforts by African Governments to popularize the use of information technology in various economic activities is essential to create the domestic demand. However, no African country by itself could have the vastness of the market at the disposal of the industrialising nations of the third world. Thus, regional cooperation is a must for capability building in information technology;

(f) "Market reserve policies" embodied in the national informatics laws are possible even at a regional level. Substantive policies and programmes are necessary to develop specialized skilled manpower as well as the development of research and development programmes in informatics firms. This may require

the efforts of development banks, the academic community, and a licensing agreement between domestic and foreign firms; and

(g) Human resources development should be given priority by training more people in the use of information technologies. With the development and advances in the application of new technologies for generating and disseminating socio-economic data/information, training in the use of appropriate information technology is becoming very crucial. However, the success in the implementation of the suggested policy guidelines and recommendations depends significantly on the political will of each country on the continent, as well as of all of them as a collective entity, in pursuit of socio-economic development and integration of Africa.

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